Listing of Claims:

1. (Previously Presented) A computer-implemented method, tangibly embodied on a computer readable storage medium, which when executed will quantify the reliability test requirements of a package/chip device over a product lifetime comprising:

- modeling a plurality of different types of ambient and power-driven temperature cycle fluctuations the package/device is expected to undergo over the product lifetime; and
- determining the accelerated life test requirements that represent each of the plurality of different types of temperature cycles fluctuations.

2. (Original) The method of claim 1, wherein the different types of ambient and power-driven temperature cycles are: storage cycles, air shipping cycles, ground shipping cycles, on/idle operation cycles, power on/off, application use cycles within and between program use, and product transfer cycles.

3. (Original) The method of claim 1, wherein the test requirements depend upon a market application use of the package/chip device.

4. (Original) A method of relating accelerated life test parameters used to assess reliability of a package/chip device to expected frequencies and magnitudes of temperature cycle fluctuations encountered by the package/chip device over a product lifetime, the method comprising:

- defining a particular market application use for the package/chip device;
- quantifying expected frequencies and magnitudes of temperature fluctuations of the package/chip device in each of a plurality of temperature cycle fluctuation regimes, based in part on the particular market application use of the package/chip device; and
- incorporating the quantified expected frequencies and magnitudes of the temperature fluctuations of the package/chip device in each of the temperature regimes into an accelerated life model.

5. (Original) The method of claim 4, wherein the ambient and power-driven temperature cycle fluctuation regimes include at least one of:

- storage cycles;
- air shipping cycles;

- ground shipping cycles;
- on/idle cycles;
- within and between application use cycles;
- operator transport cycles;
- power on/off cycles

6. (Original) The method of claim 5, further comprising:
   - providing a program interface for receiving user inputs regarding package/chip device design, use, and environmental test chamber parameters;
   - including the user inputs and a warranty life associated with the market application use; and
   - using subroutines to calculate parameters related to use conditions of the package/chip device in the market application by retrieving field data from databases.

7. (Original) The method of claim 6, wherein the subroutines include at least:
   - a consumer behavior subroutine that applies information relating to typical consumer behavior associated with the market application specified;
   - an application workload subroutine that applies information relating to power consumption of various typical applications; and
   - an environmental conditions subroutine that applies information relating to both external and internal temperature conditions associated with the market application specified.

8. (Original) The method of claim 6, further comprising:
   - estimating ambient temperature fluctuation frequencies for each of the temperature cycle fluctuation regimes over the lifetime of the product based on the user inputs and the parameters calculated by the subroutines; and
   - estimating power driven temperature fluctuation frequencies over the lifetime of the product based on the user inputs and the parameters calculated by the subroutines.
9. (Original) The method of claim 8, further comprising:
   - calculating a temperature profile of the package/chip device over the lifetime of the product using the estimated ambient temperature fluctuation frequencies, the

estimated power driven fluctuation frequencies, and the parameters calculated by the subroutines;

- wherein the temperature profile includes a probability density function for each temperature fluctuation regime and the power cycle fluctuations.

10. (Original) The method of claim 9, wherein the temperature profiles also include an estimate of rates of temperature change, ramp times and dwell times in each ambient temperature cycle fluctuation regime and in the power driven temperature cycle fluctuations.

11. (Original) The method of claim 9, further comprising:

- inputting the user inputs, temperature fluctuation frequencies, and temperature profile into the accelerated life model;
- calculating, according to the accelerated life model, a probability density function of a number of accelerated test cycles required to simulate the temperature fluctuations that occur over the product lifetime; and
- calculating a number of accelerated on/off power cycles required to simulate the on/off power cycle fluctuations that occur over the product lifetime;
- wherein the calculations are based on the input user inputs, temperature fluctuation frequencies, power cycle fluctuation frequencies and temperature profile; and the user inputs which include a power law coefficient and a failure mode type.

12. (Original) The method of claim 11, further comprising:

- outputting the temperature profile and the probability density function of the number of accelerated test cycles required to simulate the ambient temperature fluctuations in tabular and graphic form; and
- outputting the probability density function of the number of accelerated on/off power cycles required to simulate the on/off power cycle fluctuations in tabular and graphic form;
- wherein the probability density functions of the number of accelerated test cycles and the number of on/off power cycles required to simulate the temperature fluctuations and on/off power cycle fluctuations indicates respective numbers of accelerated test cycles and accelerated on/off power cycles required to achieve various confidence levels that the package/chip device will not fail over the warranty lifetime.

13. (Original) The method of claim 11, wherein the accelerated life model includes a modified Coffin-Manson empirical model.

14. (Original) The method of claim 12, wherein the modified Coffin-Manson model calculates a total number of required accelerated test cycles as a sum of usage terms quantifying the stresses contributed by each ambient and power driven temperature cycle fluctuation regime, the usage terms being equal to the number of temperature fluctuation cycles occurring in each regime multiplied by a temperature fluctuation ratio raised to the power of the power law coefficient.

15. (Original) The method of claim 14, wherein the temperature fluctuation ratio includes a material property factor to account for temperature creep and plasticity.

16. (Original) A method of systematically quantifying representative field use conditions associated with a particular product having a package/chip device, the method comprising:

- defining a product market segment;
- defining a shipping route taken by the product;
- identifying temperature cycle fluctuations and power cycles fluctuations encountered by the package /chip of the product; and
- quantifying frequencies and magnitudes of temperature fluctuations pertinent to each identified ambient and power driven temperature fluctuation, wherein the frequencies and magnitudes are based in part on the product market segment and the shipping route.

17. (Original) The method of claim 16, further comprising:

- extracting information from databases related to customer behavior, application workload, and environmental conditions applicable to the product market segment and shipping route of the product; and
- determining frequencies and magnitudes of ambient and power driven temperature fluctuations for the life of the product based on the extracted information.

18. (Original) The method of claim 17, further comprising:

- defining a warranty life of the product; and

- calculating a temperature profile for the package/chip device over the warranty life of the product based on the quantified frequencies and magnitudes of each ambient and power driven temperature fluctuation.

19. (Original) An article comprising a computer-readable storage medium which stores computer-executable instructions for causing a computer system to:

- define a particular market application use for the package/chip device;
- quantify expected frequencies and magnitudes of temperature fluctuations of the package/chip device in each of a plurality of temperature cycle fluctuation regimes, based in part on the particular market application use of the package/chip device; and
- incorporate the quantified expected frequencies and magnitudes of the temperature fluctuations of the package/chip device in each of the temperature regimes into an accelerated life model.

20. (Original) The article of claim 19, wherein the storage medium stores further instructions for causing a computer system to:

- provide a program interface for receiving user inputs regarding package/chip device design, use, and environmental test chamber parameters;
- include user inputs and a warranty life associated with market application use; and
- process the user inputs in subroutines, the subroutines calculating parameters related to use conditions of the package/chip device in the market application use by retrieving field data from databases.

21. (Original) The article of claim 20, wherein temperature fluctuation regimes include at least one of:

(a) storage cycles;
(b) air shipping cycles;
(c) ground shipping cycles;
(d) on/idle cycles;
(e) varied application use cycles;
(f) operator transport cycles; and
(g) power on/off cycles.

22. (Original) The article of claim 20, wherein the storage medium stores further instructions for causing a computer system to:

- estimate temperature fluctuation frequencies for each of the temperature cycle fluctuation regimes over the warranty life of the product based on the user inputs and the parameters by the subroutines; and
- calculate a temperature profile of the package/chip device over the warranty life of the product using the estimated temperature fluctuation frequencies and the parameters calculated by the subroutines.